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Original Article

Development And Validation Of A Simple RP-HPLC Method For Estimation Of Ceftazidime In Bulk And Pharmaceutical Formulation

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ABSTRACT

A simple, accurate, precise, specific and robust RP-HPLC method was developed and validated for the estimation of Ceftazidime in pharmaceutical formulations. The optimized chromatographic conditions consisted of a C18 column (150 × 4.6 mm, 5 µm) with KH_2PO_4 buffer and methanol in the ratio of 60:40 as the mobile phase. The flow rate was 1 mL/min, detection wavelength was 261 nm, column temperature was 25°C and injection volume was 10 µL. Ceftazidime showed a retention time of 2.658 min. The method demonstrated satisfactory system suitability with theoretical plates of 8922, tailing factor of 1.10 and %RSD of 0.1. The method showed good specificity, accuracy and precision, with assay results close to 100%. Linearity was observed over 50–150 µg/mL with an excellent correlation coefficient ($R^2 = 0.9998$). The method was found to be robust under deliberate changes in chromatographic conditions. The LOD and LOQ were found to be 0.097 µg/mL and 0.322 µg/mL, respectively. Forced degradation studies showed degradation under acidic, alkaline, oxidative, thermal and photolytic conditions, while degradation products were adequately resolved from the drug peak. Therefore, the developed method is suitable for routine quality control and stability-indicating analysis of Ceftazidime.

Keywords: Ceftazidime, RP-HPLC, Method Validation, Accuracy, Precision, Linearity, Robustness, Forced Degradation, Stability-Indicating Method.

INTRODUCTION

Pharmaceutical Analysis

Pharmaceutical analysis plays an important role in the discovery, development, manufacture, and quality control of pharmaceutical products. It involves the qualitative and quantitative determination of active pharmaceutical ingredients (APIs), impurities, degradation products, and other components present in pharmaceutical formulations. Analytical techniques are essential for establishing the identity, purity, potency, safety, and quality of drug substances and drug products.

Importance of Analytical Methods

Analytical method development and validation are essential components of pharmaceutical research and quality control. Reliable analytical methods are required to obtain accurate, precise, reproducible, and scientifically valid results. The increasing complexity of pharmaceutical formulations has resulted in the extensive use of instrumental analytical techniques such as HPLC, UV-Visible spectroscopy, HPTLC, GC, mass spectrometry, and hyphenated techniques.

High-Performance Liquid Chromatography (HPLC)

High-performance liquid chromatography (HPLC) is one of the most widely used instrumental analytical techniques in pharmaceutical analysis. It is a powerful separation technique in which the components of a sample are separated according to their differential distribution between the stationary phase and mobile phase. HPLC is extensively used for identification, assay, impurity profiling, degradation studies, and quantitative estimation of pharmaceutical compounds.

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Principle of HPLC

The separation in HPLC is primarily based on the differential interaction of analyte molecules with the stationary and mobile phases. Depending on the chromatographic mode, separation may occur through adsorption, partition, ion exchange, size exclusion, or affinity interactions. Differences in the physicochemical properties of analytes result in different retention times, allowing individual components to be separated and quantified.

Modes of HPLC

HPLC can be classified according to the mode of separation, elution technique, and scale of operation. The major chromatographic modes include normal-phase chromatography, reversed-phase chromatography, ion-exchange chromatography, size-exclusion chromatography, affinity chromatography, and chiral chromatography. Based on elution, HPLC methods may be classified as isocratic or gradient elution, while based on application they may be analytical or preparative HPLC.

Reversed-Phase HPLC

Reversed-phase HPLC is the most commonly employed mode for pharmaceutical analysis. It generally uses a non-polar stationary phase such as C18 or C8 bonded silica and a relatively polar mobile phase consisting of water or aqueous buffer with organic solvents such as methanol or acetonitrile. Retention and separation are influenced by factors such as stationary-phase chemistry, mobile-phase composition, pH, ionic strength, temperature, and flow rate. **Isocratic and Gradient Elution**

In isocratic HPLC, the composition of the mobile phase remains constant throughout the chromatographic analysis. In contrast, gradient elution involves a systematic change in mobile-phase composition during the separation. Isocratic conditions are commonly suitable for relatively simple mixtures, whereas gradient conditions may provide improved separation for samples containing compounds with substantially different retention characteristics.

Instrumentation of HPLC

A typical HPLC system consists of a mobile-phase reservoir, degassing system, high-pressure pump, injector or autosampler, chromatographic column, detector, and computerized data-processing system. Each component performs a specific function to ensure efficient separation, detection, and quantitative evaluation of the analytes.

Mobile Phase and Reservoir

The mobile phase is stored in suitable solvent reservoirs and delivered through the chromatographic system at a controlled flow rate. It commonly consists of water or aqueous buffers combined with organic solvents. The mobile phase should be compatible with the analyte and stationary phase and should provide adequate separation, peak shape, and reproducibility. Filtration and degassing are generally performed before use to minimize particulate contamination and dissolved-gas-related problems.

Degassing System

Dissolved gases in the mobile phase can produce bubbles and interfere with detector performance and baseline stability. Therefore, mobile phases are commonly degassed using techniques such as vacuum degassing, helium purging, ultrasonication, or membrane-based online degassing. Modern HPLC instruments frequently incorporate an online degassing system.

Pump

The pump delivers the mobile phase through the chromatographic column at a controlled and reproducible flow rate. Since HPLC columns are packed with small particles and generate considerable back pressure, high-pressure pumps are required. Stable flow delivery is important for obtaining reproducible retention times and chromatographic performance.

Injector

The injector introduces a measured volume of sample into the flowing mobile phase. Manual injection valves or automated autosamplers may be used depending on the HPLC system. Liquid samples are generally injected directly after appropriate

preparation, whereas solid pharmaceutical samples are first dissolved or extracted using a suitable solvent.

Chromatographic Column

The chromatographic column is considered the heart of the HPLC system because the actual separation of sample components occurs within the column. Reversed-phase C18 and C8 columns are widely used in pharmaceutical analysis. Column performance depends on parameters such as stationary-phase chemistry, particle size, column dimensions, carbon loading, and end-capping characteristics.

Detector

The detector converts the presence of separated analytes into measurable signals. UV-visible and photodiode array detectors are commonly used for pharmaceutical analysis because many drug molecules possess chromophores that absorb ultraviolet or visible radiation. Other detectors include fluorescence, electrochemical, refractive-index, conductivity, evaporative light-scattering, and mass spectrometric detectors.

Data Acquisition System

The detector generates an electronic signal that is processed by computerized data-acquisition software. The system records and evaluates chromatographic parameters such as retention time, peak area, peak height, resolution, and other system suitability parameters. Modern data systems improve the accuracy, reproducibility, documentation, and processing of chromatographic results.

Advantages of HPLC

HPLC offers several advantages, including high sensitivity, selectivity, accuracy, precision, reproducibility, rapid analysis, high resolution, and suitability for automation. It is capable of analyzing compounds that are non-volatile or thermally unstable and therefore unsuitable for gas chromatography. HPLC is also suitable for the quantitative analysis of complex pharmaceutical samples.

Limitations of HPLC

Despite its advantages, HPLC has certain limitations. The instrumentation and maintenance costs can be relatively high, and the technique requires high-purity solvents and regular maintenance. It may also generate considerable solvent waste. Furthermore, conventional HPLC detection may provide limited structural information about individual peaks compared with hyphenated techniques such as LC-MS.

Analytical Method Development

Analytical method development involves the systematic selection and optimization of experimental conditions to obtain a reliable analytical procedure. Important factors include sample preparation, selection of chromatographic column, mobile-phase composition, pH, flow rate, detection wavelength, column temperature, injection volume, and run time. The optimized method should provide satisfactory specificity, resolution, sensitivity, accuracy, precision, and reproducibility.

Need for Analytical Method Development

New analytical methods may be required when no suitable official method is available or when an existing method has inadequate accuracy, precision, sensitivity, selectivity, or robustness. Method development may also be undertaken to reduce analysis time, solvent consumption, cost, and complexity or to improve automation and overall analytical performance.

Analytical Method Validation

Analytical method validation provides documented evidence that an analytical procedure is suitable for its intended purpose. Validation is performed according to applicable regulatory and scientific guidelines, including ICH and USFDA recommendations. A validated analytical method should consistently produce reliable and reproducible results under defined analytical conditions.

Validation Parameters

The major analytical method validation parameters include system suitability, specificity, accuracy, precision, linearity, range, limit of detection (LOD),

limit of quantitation (LOQ), and robustness. Depending on the purpose of the method, additional parameters such as solution stability and ruggedness may also be evaluated.

Accuracy and Precision

Accuracy represents the closeness of the measured analytical result to the accepted or true value. Precision represents the degree of agreement among repeated measurements. Precision may be evaluated as repeatability, intermediate precision, and reproducibility, depending on the intended application of the method.

Specificity

Specificity is the ability of an analytical method to measure the analyte accurately in the presence of other components that may be expected to be present in the sample, such as excipients, impurities, degradation products, or matrix components. It is particularly important for stability-indicating analytical methods.

Linearity and Range

Linearity demonstrates the ability of the analytical procedure to obtain test results that are directly proportional to the concentration of analyte within a specified range. A calibration curve is generally prepared using different concentrations of the analyte, and regression analysis is performed to evaluate the relationship between concentration and analytical response.

Limit of Detection and Limit of Quantitation

The limit of detection (LOD) is the lowest amount of analyte that can be detected but not necessarily quantified with suitable accuracy and precision. The limit of quantitation (LOQ) is the lowest concentration of analyte that can be quantitatively determined with acceptable accuracy and precision.

Robustness

Robustness is the ability of an analytical method to remain unaffected by small deliberate variations in method parameters. In HPLC, parameters such as mobile-phase composition, pH, flow rate, detection wavelength, and column temperature may be varied to assess the robustness of the method.

Stability-Indicating HPLC Method

A stability-indicating HPLC method is designed to accurately measure the active pharmaceutical ingredient in the presence of degradation products and other potential interferences. Such methods are particularly important for stability studies and evaluation of the chemical stability of pharmaceutical products.

Applications of HPLC in Pharmaceutical Analysis

HPLC is widely applied for assay determination, impurity profiling, degradation studies, dissolution sample analysis, content uniformity, stability testing, and quality control of pharmaceutical products. It is also extensively used during formulation development, process development, research and development, and regulatory analysis.

Regulatory Importance of HPLC Method Validation

Validated analytical methods are essential for pharmaceutical quality control and regulatory compliance. Appropriate validation demonstrates that the analytical procedure is capable of producing reliable results for its intended application. Therefore, HPLC method development followed by systematic validation is an important part of pharmaceutical analytical research.

MATERIAL AND METHOD

Instruments/Equipment Used

S.NO	Equipment's	Model	Company
1	Electronic Balance	ER200A	ASCOSET
2	Ultra-Sonicator	SE60US	ENERTECH
3	Heating Mantle	BTI	BIO TECHNICS INDIA

4	Thermal oven	---------	NARANG
5	pH Meter	AD102U	ADWA
6	Filter Paper 0.45 microns	---------	MILLI PORE

Table No 1: Instruments/Equipment Used

CHEMICALS AND REAGENTS USED

Sr. No.	Chemicals/standards and reagents	Grade	Make
1	KH2PO4	AR	Finar
2	ACETONITRILE	HPLC	Merck
3	METHANOL	HPLC	Merck
4	WATER	HPLC	Loba Chemi
5	CEFTAZIDIME	NA	BIOCON

Table 2: Chemicals And Reagents

METHOD DEVELOPMENT

OPTIMIZED METHOD

Mobile Phase	**KH_2PO_4: Methanol (60:40)**
Column	INERTSIL, C18, 150X4.6mm, 5µm
Flow Rate	1ml/Min
Column Temperature	25˚C
Sample Temperature	25˚C
Volume	10µl
Run time	5min
Detector	261
pH	3.5

Procedure:

Standard and sample (10 µL) were injected, peak areas were recorded, and % assay was calculated.

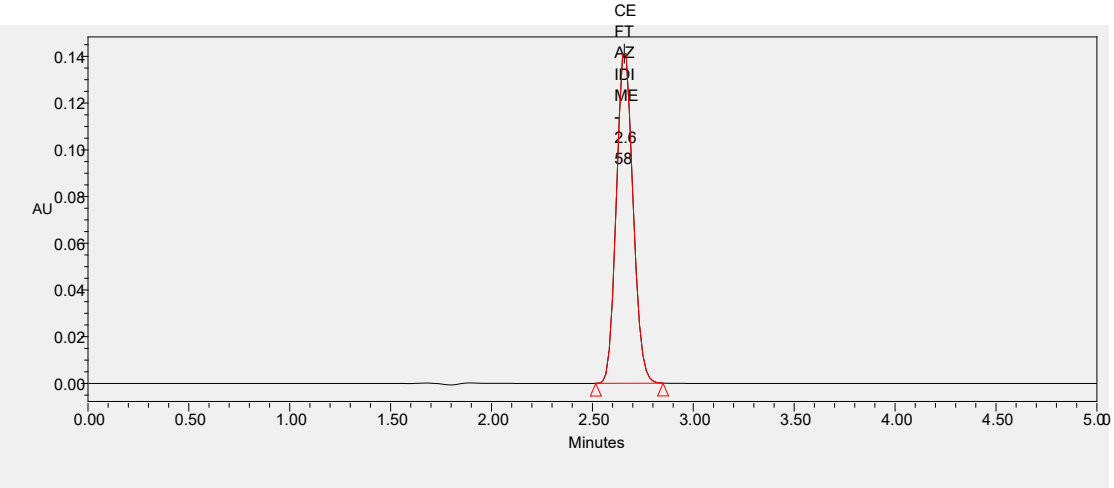


Fig 1: Chromatogram for optimized method

Sl. No.	Name	Retention Time	Area	% Area	Height	USP Tailing	USP Plate Count
1	CEFTAZIDIME	2.658	1317572	100.00	142594	1.10	8922

The optimized peak showed suitable retention time, symmetry, plate count and tailing, so the method was taken for validation.

PREPARATION OF MOBILE PHASE

KH_2PO_4 buffer and methanol (60:40) were mixed and sonicated for 20 min; pH was adjusted as specified.

PREPARATION OF CEFTAZIDIME STANDARD AND SAMPLE SOLUTION

PREPARATION OF STANDARD SOLUTION

10 mg Ceftazidime was diluted to 10 mL with HPLC water, sonicated for 10 min, then 1 mL was diluted to 10 mL with water.

PREPARATION OF SAMPLE STOCK SOLUTION

Ten tablets were powdered and an amount equivalent to 100 mg Ceftazidime was diluted to 100 mL. The solution was sonicated/shaken, further diluted, and filtered through a 0.45 µm filter before injection.

ASSAY RESULT FOR FORMULATION

Purity of working standard:

Ceftazidime purity: 99.8%.

Sample preparation:

Standard preparation**:** Accurately weigh and transfer 10mg Ceftazidime into 10ml of volumetric flask and a makeup with hplc water sonicate 10 min . Transfer the above solution into 1ml into 10ml volumetric flask dilute to volume with water.

Procedure:

Standard and sample preparations were injected separately and peak areas were recorded.

METHOD VALIDATION

1. SYSTEM SUITABILITY

Acceptance limits: tailing factor ≤2.0 and theoretical plates ≥2000.

2. SPECIFICITY

Standard, sample, blank and placebo solutions were injected to assess interference.

Acceptance criteria: Standard and sample chromatograms should show comparable retention time.

Blank interference was evaluated.

Diluent was injected into the HPLC system.

Acceptance criteria: No blank interference was observed at the analyte retention time; the method was specific.

3. LINEARITY

Standard solutions were injected and peak area was plotted against concentration to determine linearity.

Acceptance criteria: Acceptance limits: $r^2 \geq 0.999$ and y-intercept within ±2.0%.

Statistical evaluation: Least-squares regression was used to calculate slope, intercept and correlation coefficient.

4. PRECISION

Preparation of sample:

- 100 mg sample was diluted to 100 mL with water/methanol and sonicated for 20 min.
- A 10 mL aliquot was diluted to 100 mL with water.
- Precision was assessed from six replicate injections using %RSD of peak areas.

Acceptance limit: %RSD ≤2.0 for peak area and retention time.

5. RECOVERY/ACCURACY

Accuracy was assessed at three concentration levels around the target concentration.

Acceptance criteria:

Acceptance limits: mean recovery 98–102% and %RSD <2%.

6. LIMIT OF DETECTION

LOD was determined from the calibration data/signal-to-noise approach.

$LOD = 3.3 \sigma / S$

σ = standard deviation of the intercepts of calibration curves.S = mean slope of the calibration curves.

S was obtained from the calibration curve.

7. LIMIT OF QUANTITATION

LOQ was determined from the calibration data/signal-to-noise approach

$LOQ = 10 \sigma / S$

σ = standard deviation of the intercepts of calibration curves.

S = mean slope of the calibration curves.

The slope S may be estimated from the calibration curve of the analytic.

ROBUSTNESS

8. Effect of flow-rate variation:

Flow rate was varied from 1.0 to 0.8 and 1.2 mL/min and system suitability was evaluated.

Effect of wavelength variation:

Wavelength was varied by ±2 nm and system suitability was evaluated.

DEGRADATION EVALUATION

- Acid: 1 mL 0.1 N HCl; sonication 30 min at room temperature.
- Base: 1 mL NaOH; sonication 30 min at room temperature.
- Oxidative: 1 mL 30% H_2O_2; sonication 30 min at room temperature.
- Neutral: 1 mL distilled water; sonication 30 min at room temperature.
- Photo: 1 mL tablet stock solution exposed to direct sunlight for 24 h.
- Thermal: 1 mL tablet stock solution exposed to 105 °C for 30 min.

RESULTS AND DISCUSSION

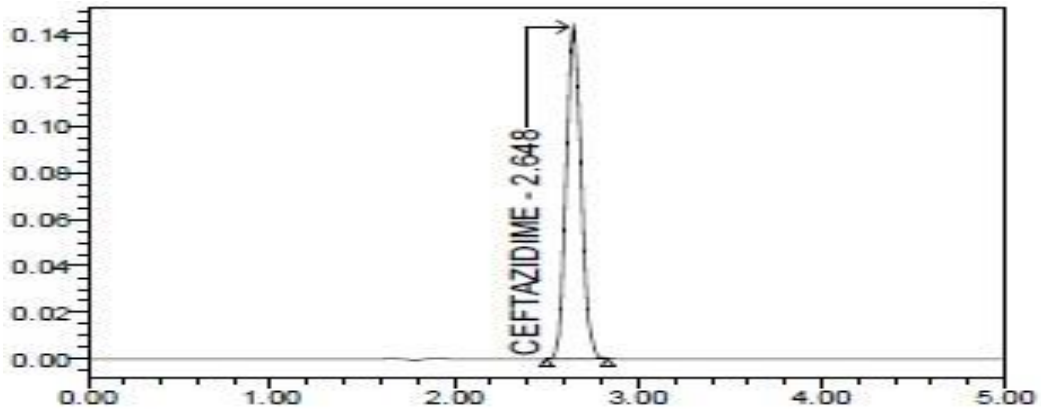
1. SYSTEM SUITABILITY

Parameters	Ceftazidime	Acceptance Criteria
Retention time	2.658	+-10
Theoretical plates	8922	>2500
Tailing factor	1.10	<2.00
% RSD	0.1	<2.00

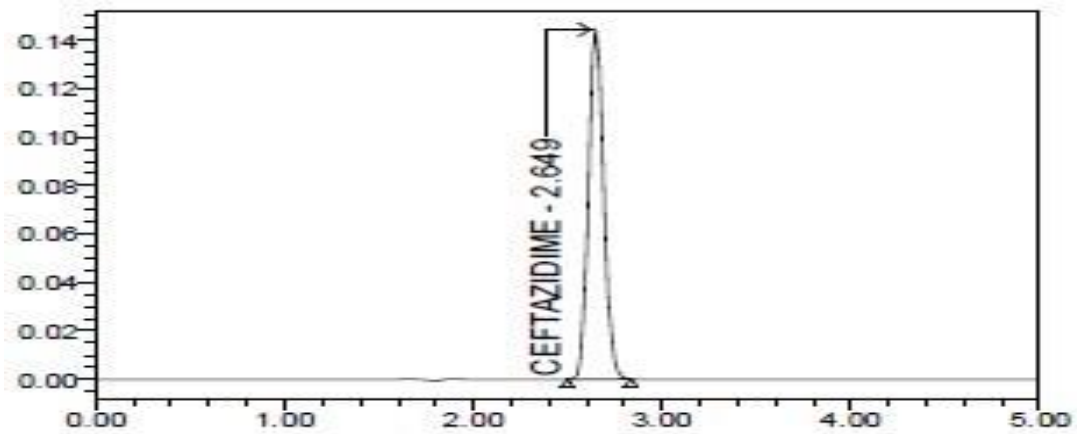
Table 3 : System suitability data of Ceftazidime

Standard results of Ceftazidime

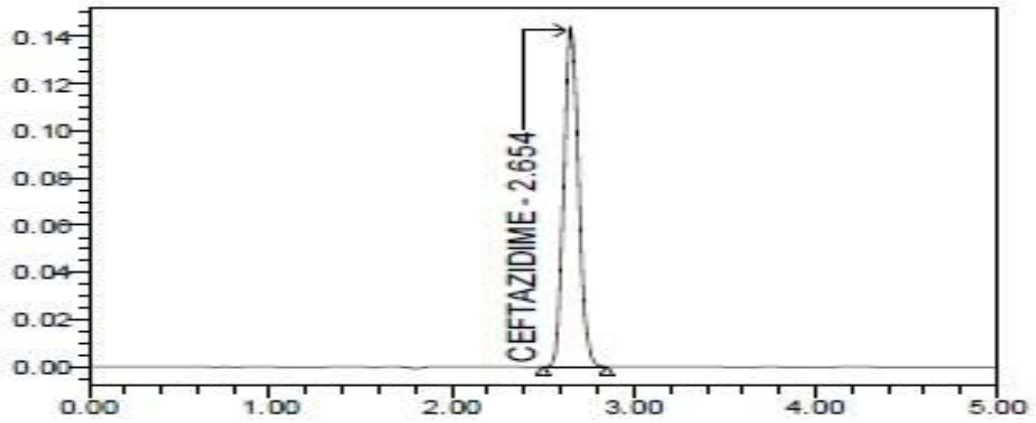
	SampleName	Peak Name	RT	Area	USP Tailing	USP Plate Count
1	STD-2	CEFTAZIDIME	2.648	1318854	1.08	8798
2	STD-2	CEFTAZIDIME	2.649	1317723	1.09	8863
3	STD-2	CEFTAZIDIME	2.654	1319437	1.11	8864
4	STD-2	CEFTAZIDIME	2.649	1318996	1.09	8860
5	STD-2	CEFTAZIDIME	2.660	1318785	1.09	8840
Mean				1318759.1		
% RSD				0.1		



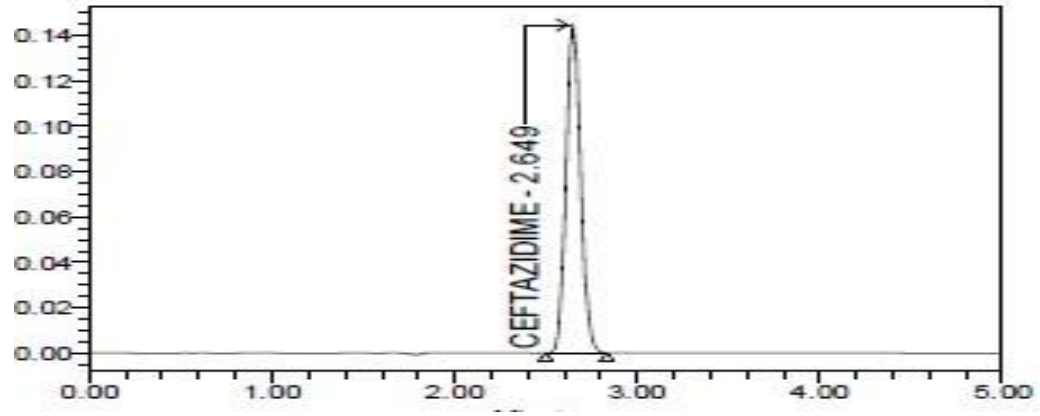
Typical Chromatogram of Standard-2; Injection-1



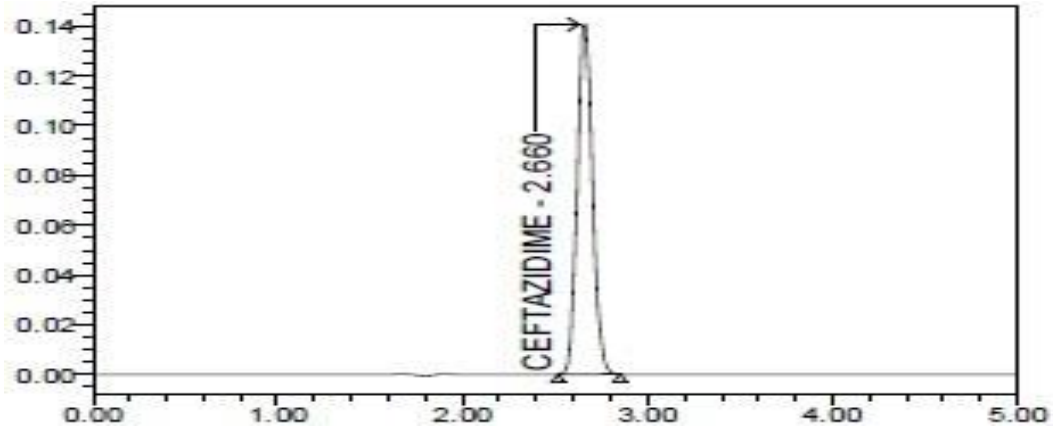
Typical Chromatogram of Standard-2; Injection-2



Typical Chromatogram of Standard-2; Injection-3



Typical Chromatogram of Standard-2; Injection-4



Typical Chromatogram of Standard-2; Injection 5

Fig 2: System suitability chromatograms of Ceftazidime

RESULT

System suitability results met the specified criteria, confirming suitable chromatographic performance.

2. SPECIFICITY

SI no	Sample name	Ceftazidime area	Rt min
1	Standard	1317572	2.658
2	Sample	1308642	2.648
3	Blank	-	-
4	Placebo	-	-

Table 4: Specificity data for Ceftazidime

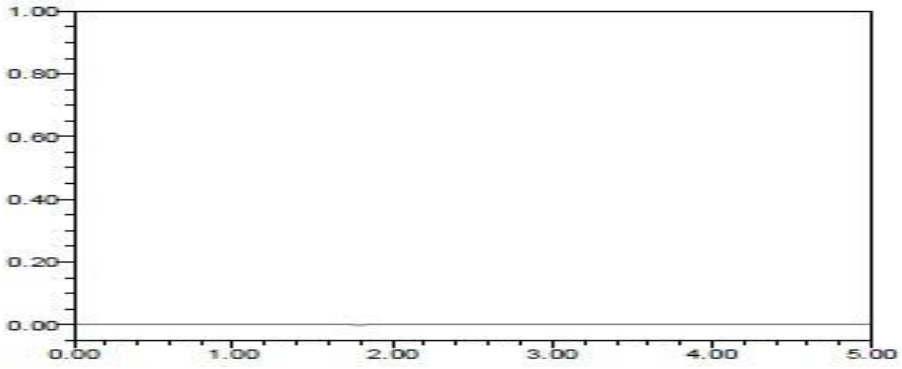


Fig 3: Typical chromatogram of the blank

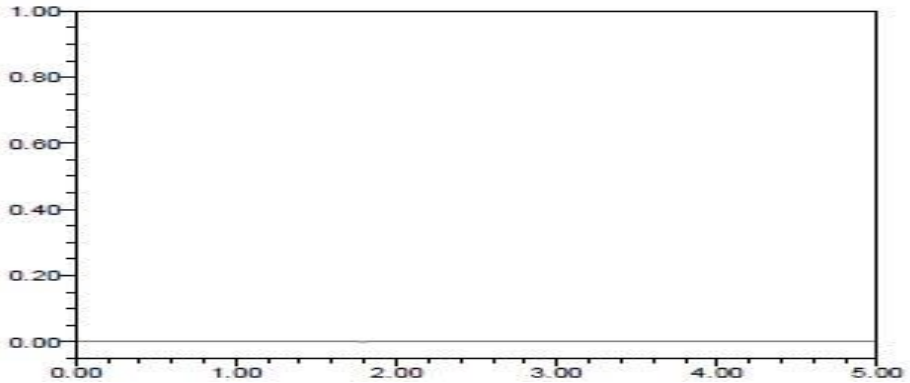


Fig 4 Typical chromatogram of the Placebo

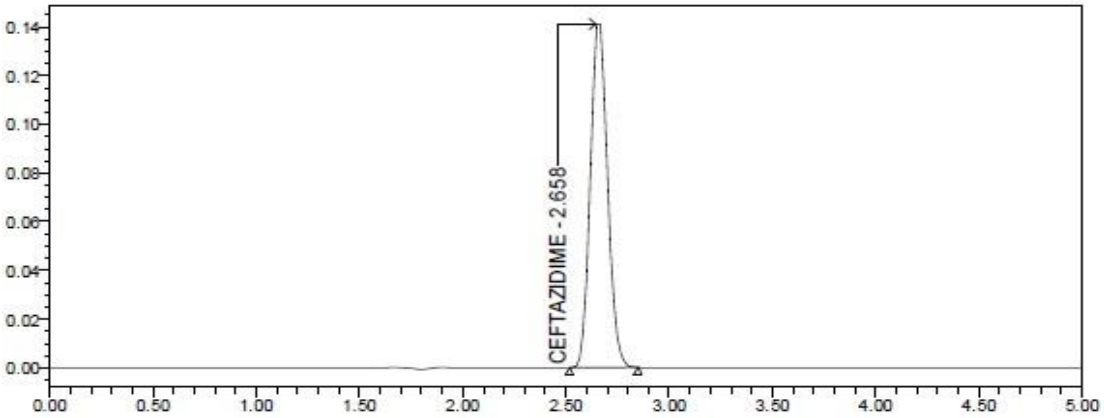


Fig 5: Chromatogram representing specificity of standard

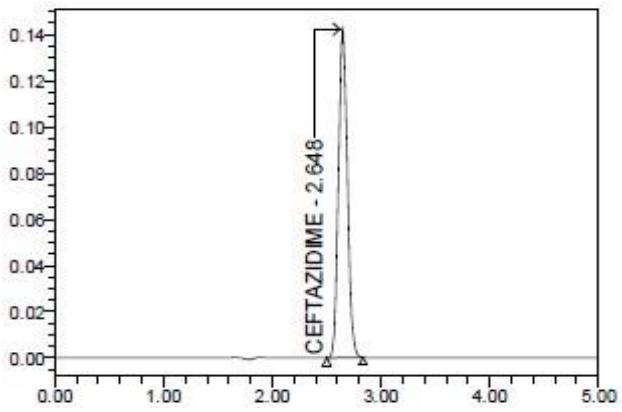


Fig 6 : Chromatogram representing specificity of sample

RESULT

Standard and sample showed comparable retention time, while blank/placebo showed no interfering peak; hence the method was specific.

3. ACCURACY:

Sl. No.	Accuracy level	Injectons	Sample area	RT min
1	50%	1	657303	2.664
		2	657843	2.662
		3	657961	2.653
2	100%	1	1291830	2.657
		2	1291184	2.658
		3	1300724	2.647
3	150%	1	1958957	2.647
		2	1959526	2.648
		3	1960860	2.684

Table 5: Accuracy data for Ceftazidime

SI.NO	Accuracy level	Sample trails	µg/ml added	µg/ml found	% Recovery	% Mean Recovery
1	50%	1	25	24.54	100	99
		2	25	24.34	98.87	
		3	25	24.76	99.20	

2	100%	1	50	50.23	100	101
		2	50	49.89	99.78	
		3	50	49.65	99.98	
3	150%	1	75	74.76	100	100
		2	75	74.89	99.35	
		3	75	74.23	99.89	

Table 6: Accuracy (%recovery) results of Ceftazidime

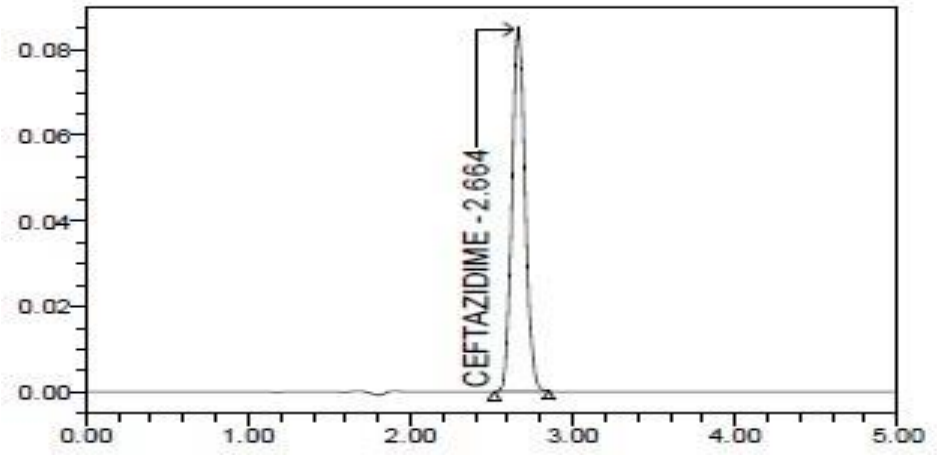


Fig 7: Typical chromatogram for Accuracy 50 %

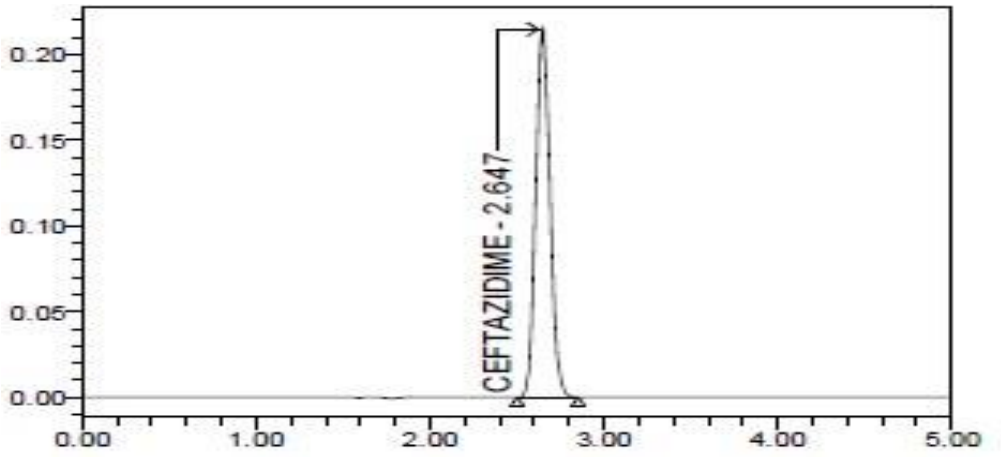


Fig 8: Typical chromatogram for Accuracy 100 %

RESULT

Accuracy was evaluated by recovery of spiked Ceftazidime at 50%, 100% and 150% levels.

Mean recovery was approximately 100%, indicating good accuracy.

4. PRECISION

SI.No	RT min	Area	%Assay
injection1	2.648	1308642	99
injection2	2.658	1308837	99
injection3	2.655	1309158	99
injection4	2.666	1309477	99
injection5	2.656	1301158	98
injection6	2.663	1300027	98
Mean			99
Std. Dev.			0.33
% RSD			0.34

Table 7: Precision data for Ceftazidime

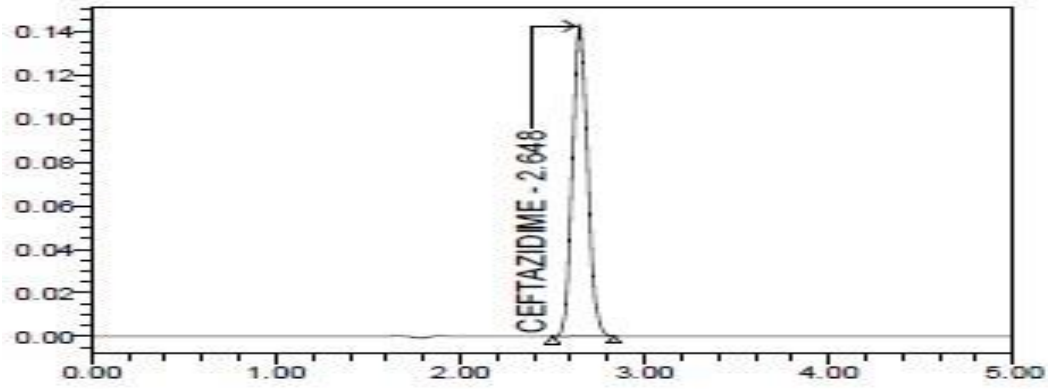


Fig 9 : Chromatogram for precision injection 1

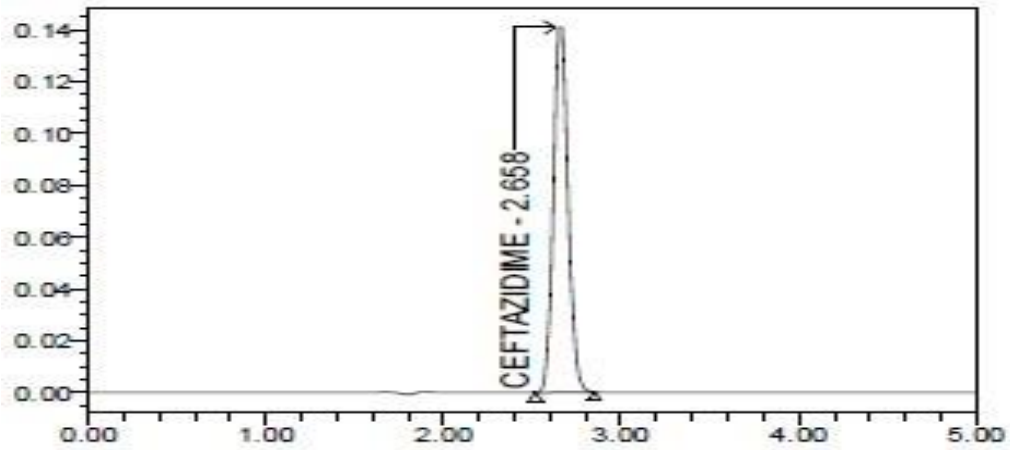


Fig 10: Chromatogram for precision injection 2

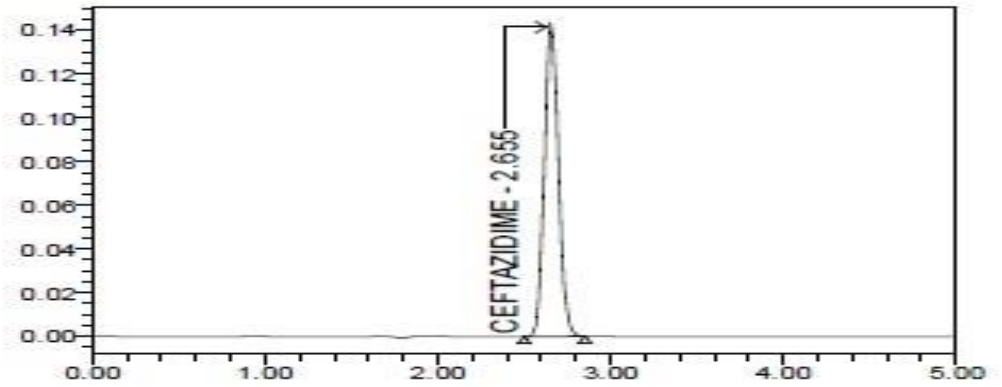


Fig 11: Chromatogram for precision injection 3

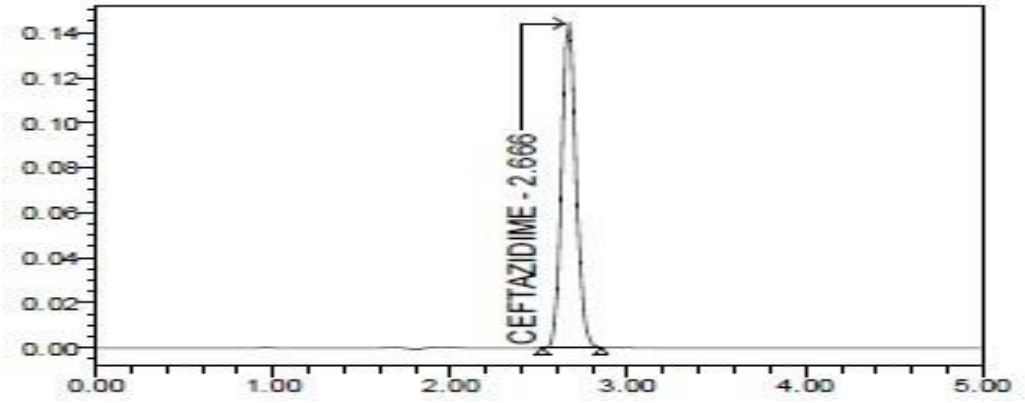


Fig 12: Chromatogram for precision injection 4

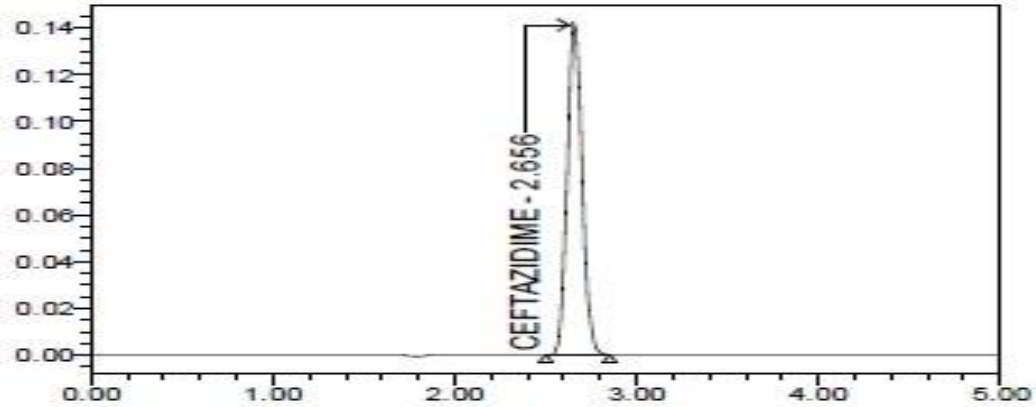


Fig 13: Chromatogram for precision injection 5

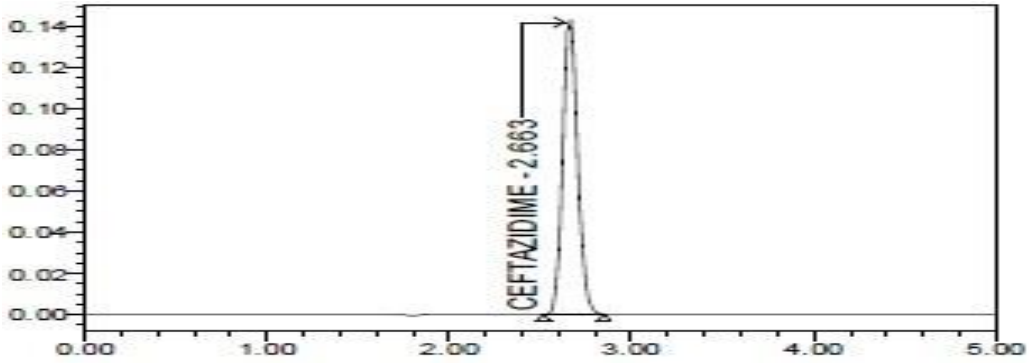


Fig 14 : Chromatogram for precision injection 6

RESULT

Six replicate injections gave %RSD of 0.34%, demonstrating good precision.

5. LINEARITY

Sl. No	Conc (µg/ml)	RT min	Area
1.	50	2.637	657534
2.	75	2.650	987817
3.	100	2.656	1292060
4.	125	2.657	1629635
5.	150	2.664	1950657
Correlation coefficient (r^2)			0.9998

Table 8: Linearity data for Ceftazidime

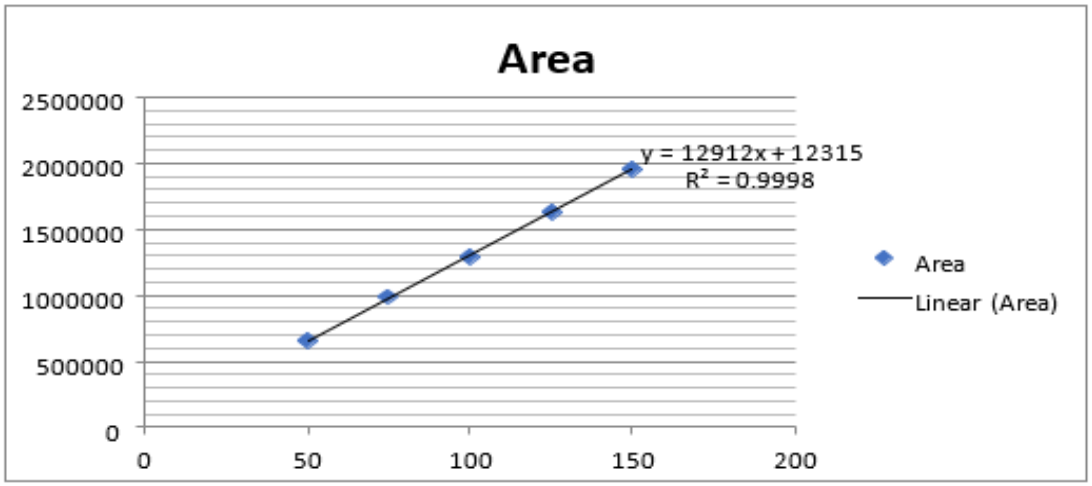


Fig 15: Linearity plot of Ceftazidime

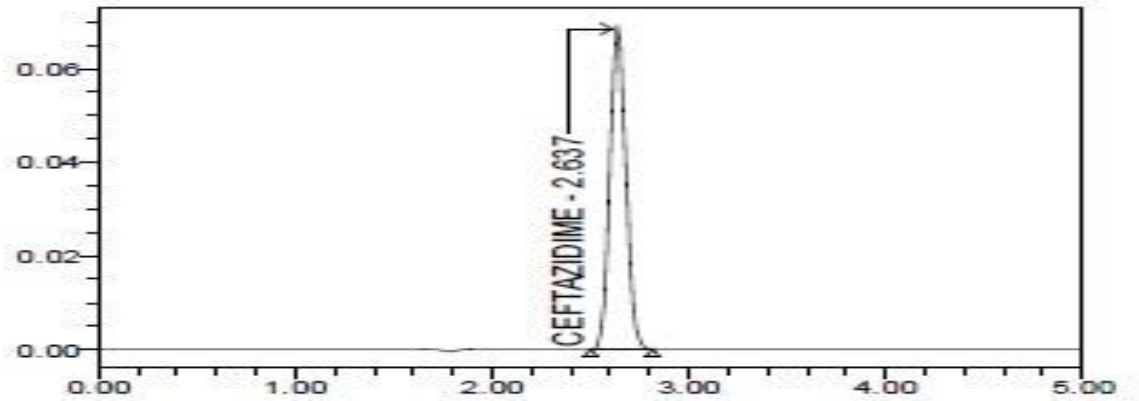


Fig 16: Chromatogram representing linearity 1

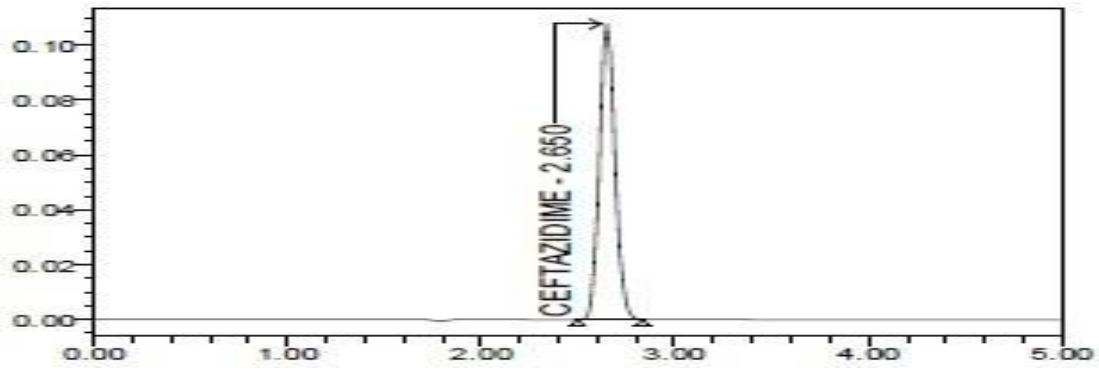


Fig 17: Chromatogram representing linearity 2

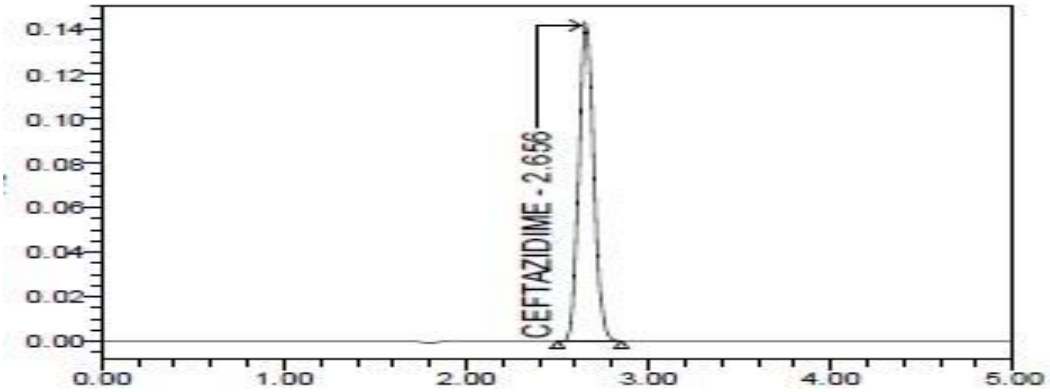


Fig 18: Chromatogram representing linearity 3

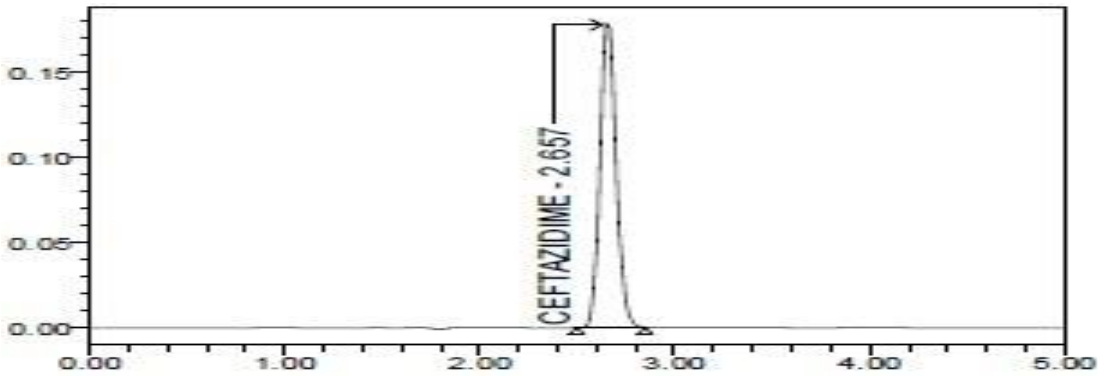


Fig 19: Chromatogram representing linearity 4

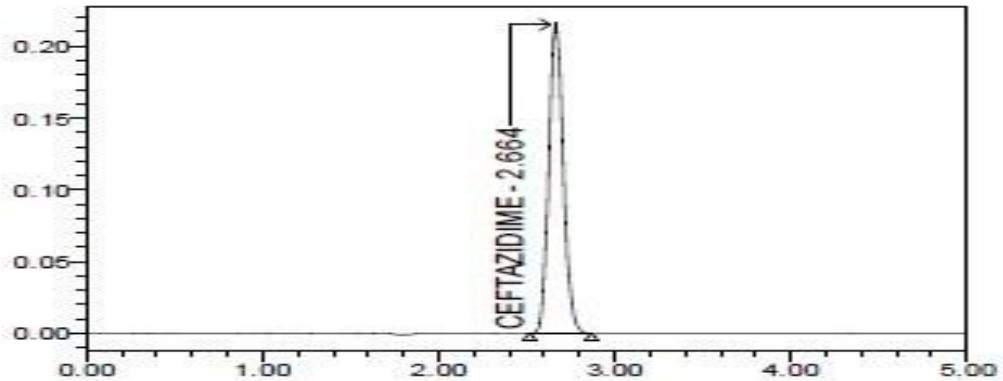


Fig 20: Chromatogram representing linearity 5

RESULT

Ceftazidime showed linearity over 50–150% of nominal concentration with $r^2 = 0.9998$.

6. ROBUSTNESS

Parameters	RT min	Theoretical plates	Asymmetry
Decreased flow rate(0.8ml/min)	2.218	8833	1.07
Increased flow rate(1.2ml/min)	3.277	8139	1.11
Decreased temperature(20^0c)	2.421	8469	1.07
Increased temperature(30^0c)	2.921	8464	1.11
Decreased comp rate (5%)	2.218	8833	1.07
Increased comp rate (5%)	2.921	8464	1.11
Decreased pH (0.2)	2.648	8772	1.09
Increased pH (0.2)	2.658	8886	1.11

Table 9: Robustness data for Ceftazidime

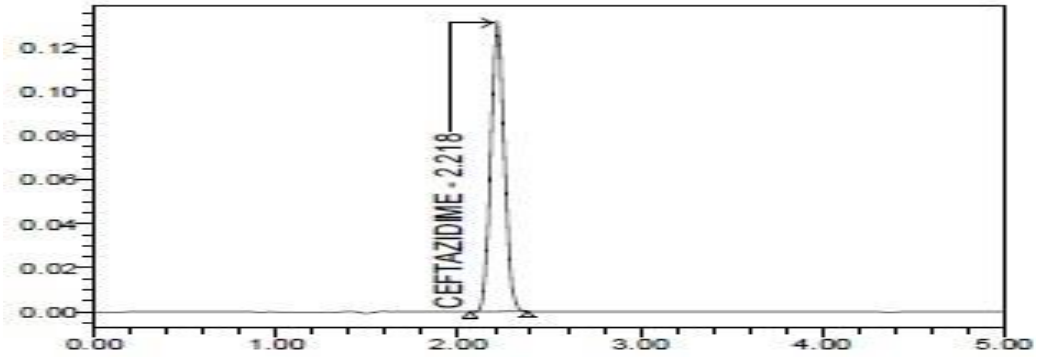


Fig 21: Chromatogram for decreased flow rate

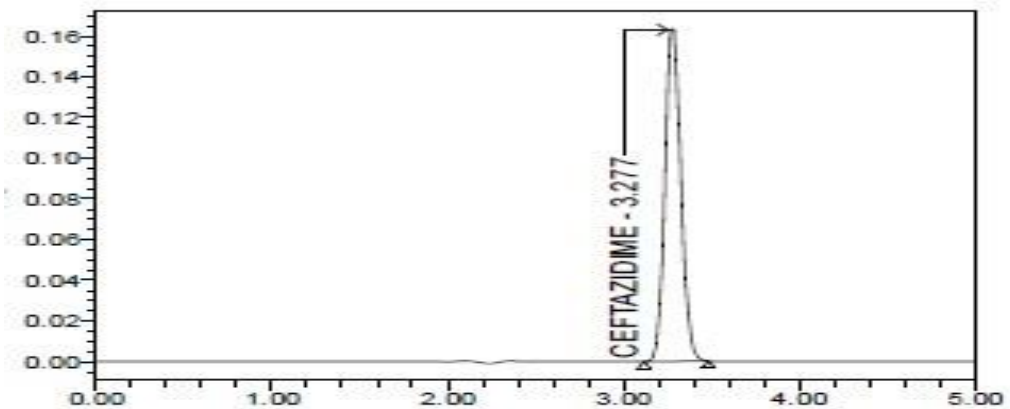


Fig 22: Chromatogram for increased flow rate

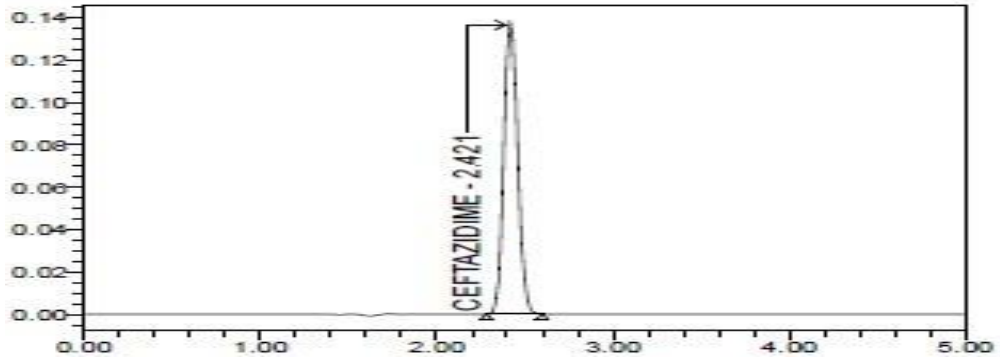


Fig 23: Chromatogram for decreased temperature

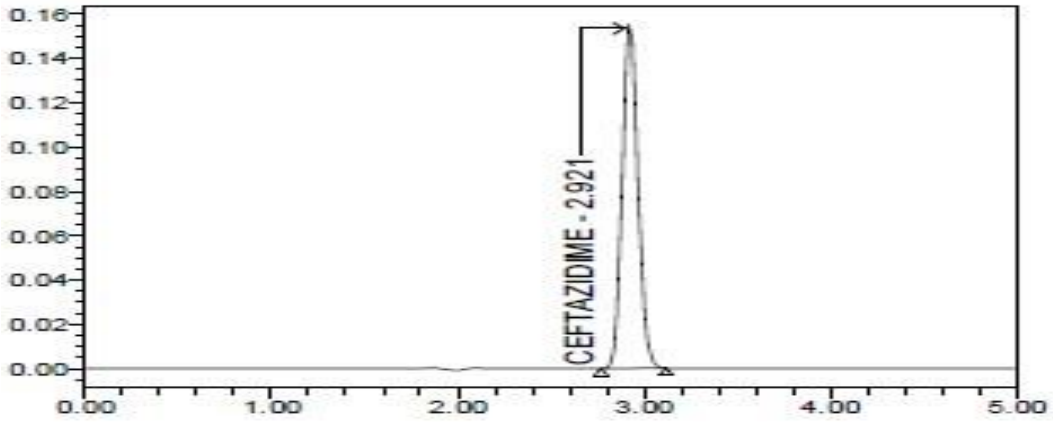


Fig 24: Chromatogram for increased temperature

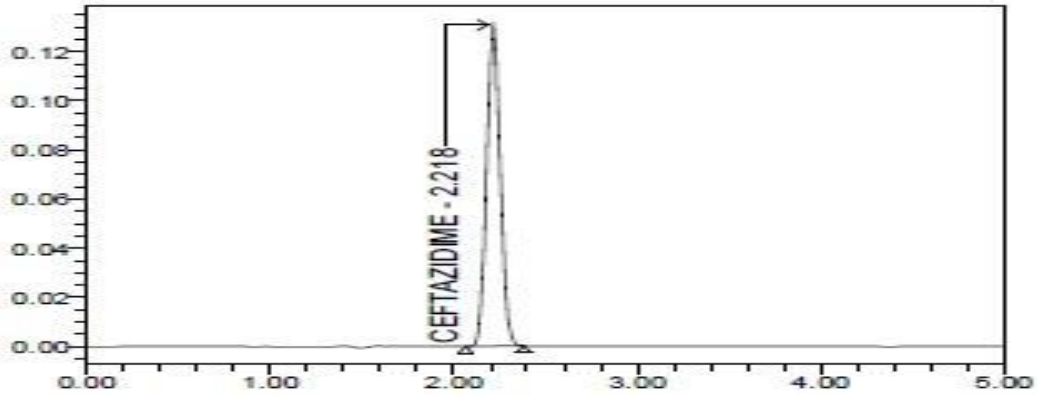


Fig 25: Chromatogram for decreased Composition

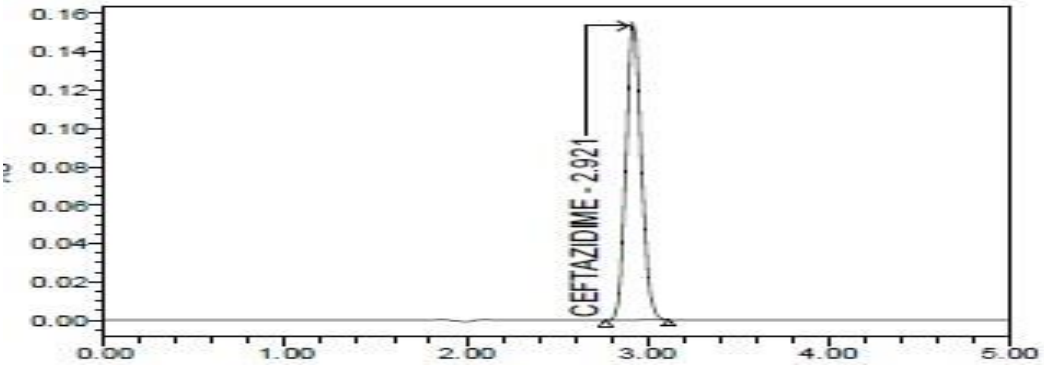


Fig 26: Chromatogram for increased Composition

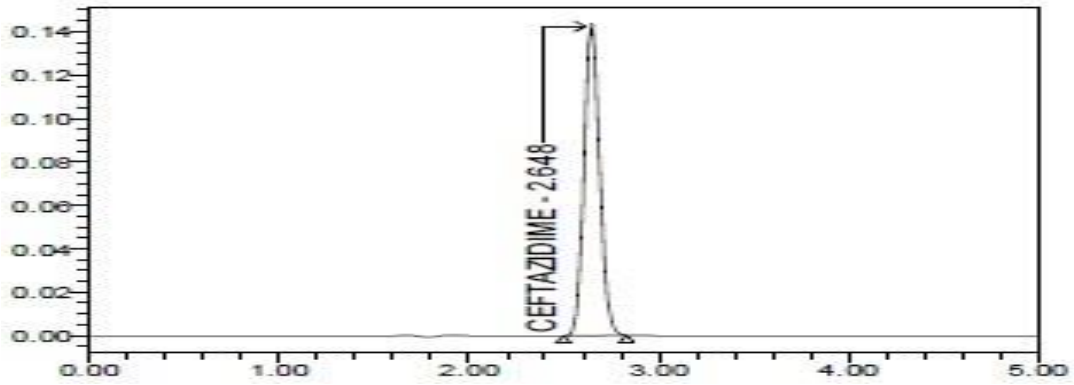


Fig 27: Chromatogram for decreased pH

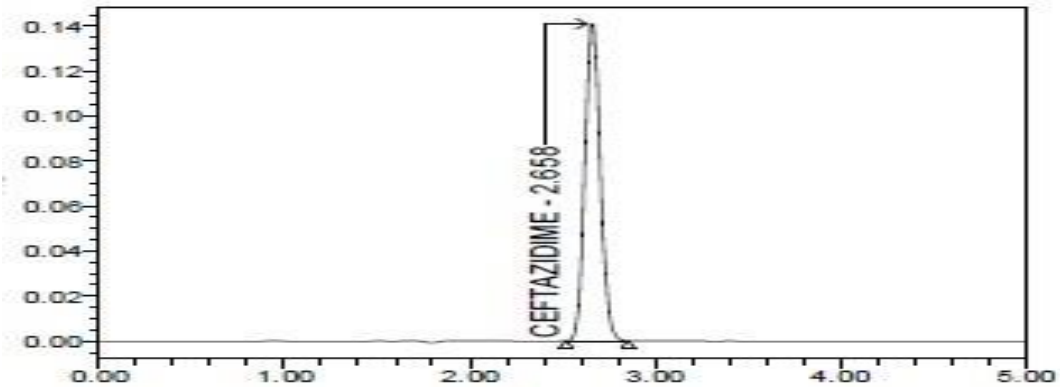


Fig 28: Chromatogram for increased pH

RESULT

Small variations in flow rate, temperature, composition and pH produced no significant effect; the method was robust.

7. LIMIT OF DETCTION:

LOD is the minimum concentration detectable above noise.

LOD = 3.3* σ/S Where; σ = standard deviation

S = slope

LOD for Ceftazidime = 0.097

Sr. No	Sample name	RT min	Area
1	Ceftazidime	2.645	15270

Table 10 : Lod Data For Ceftazidime

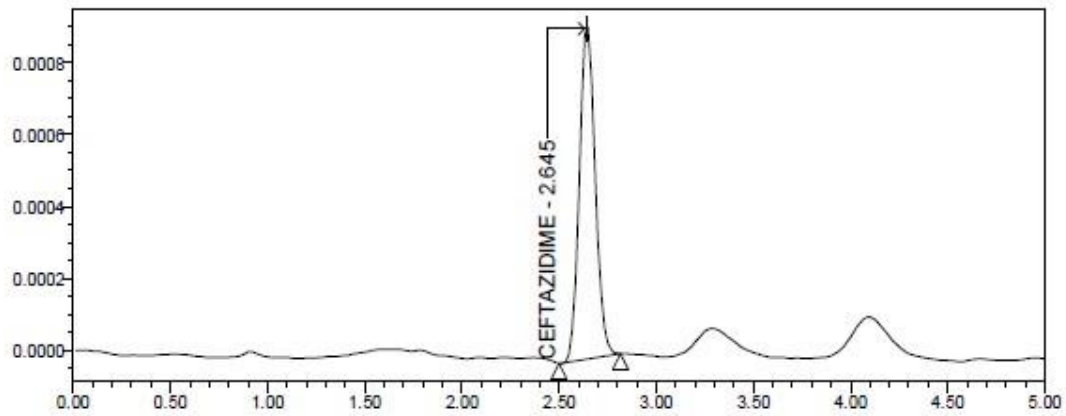


Fig 29: Chromatrogram for LOD

8. LIMIT OF QUANTIFICATION:

LOQ is the minimum concentration that can be reliably detected and quantified.

LOQ = 10*σ/S Where; σ = standard deviation

S = slope

LOQ for Ceftazidime =0.322

Sl.no	Sample name	RT min	Area
1	Ceftazidime	2.633	131833

Table 11 : LOQ data for Ceftazidime

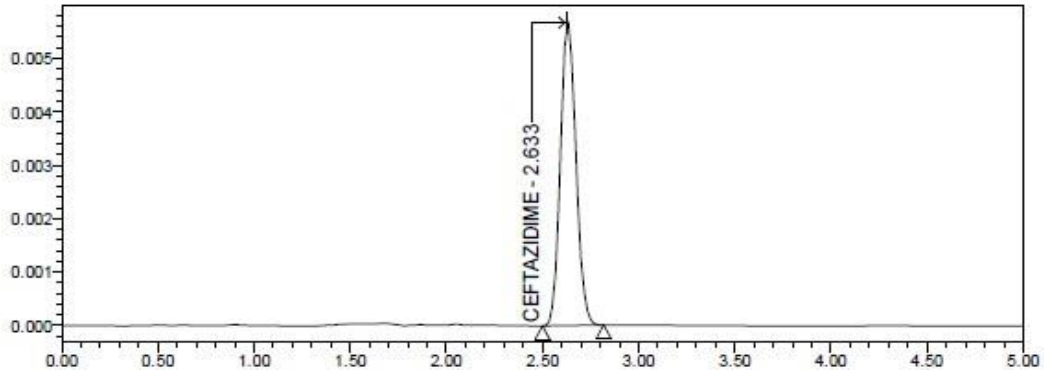


Fig 30: Chromatogram for LOQ

9. DEGRADATION STUDY

The sample solution was subjected to degradation by acid, base, oxidant, water, thermal and photo conditions. This experiment demonstrates the specificity, stability indicating nature and stability of Ceftazidime under different applied conditions.

Conditions	Percent assay	Percent degradation
	Ceftazidime	Ceftazidime
0.1 N HCL	89.62	10.38
0.1N NaOH	92.57	7.43
30% H_2O_2	95.36	4.64
105°C	90.43	9.57
Sunlight	94.84	5.16
Water	98.56	1.44

Table 12 : Ceftazidime degradation data

Ceftazidime is more sensitive to acid condition and more resistance to water condition. The degradant peaks were well resolved from the Ceftazidime peaks. No interference seen. Therefore, the method is specific and stability indicating.

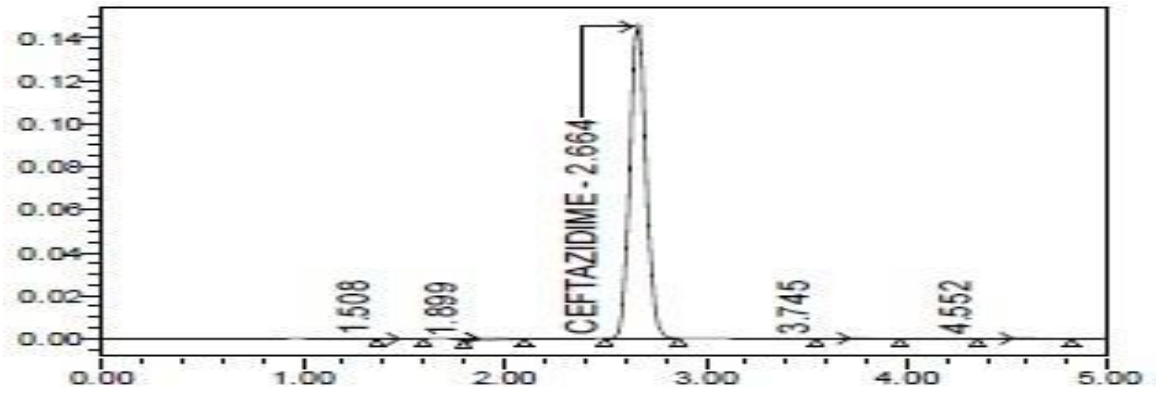


Figure 31 : Acid degraded sample chromatogram

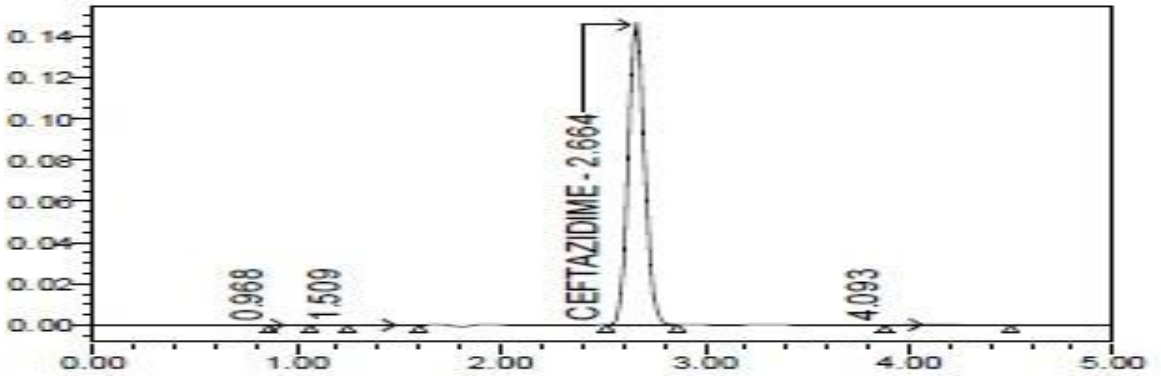


Figure 32 : Base degraded sample chromatogram

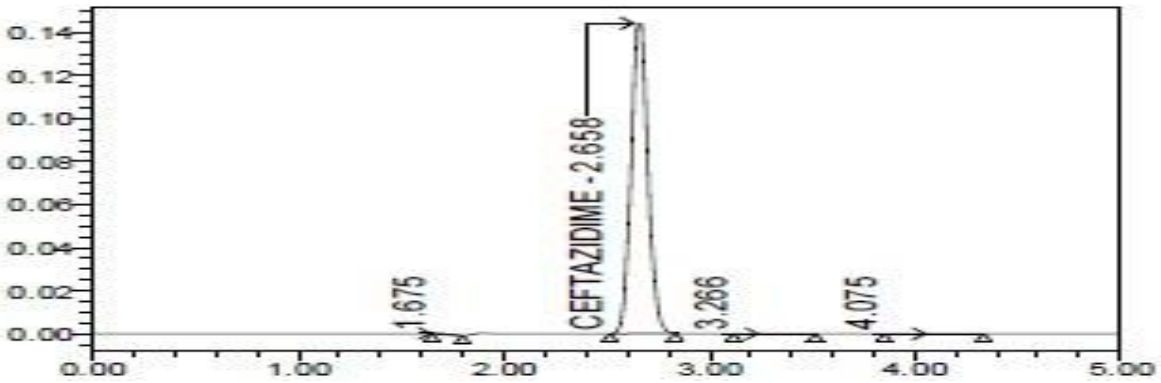


Figure 33: Oxidant degraded sample chromatogram

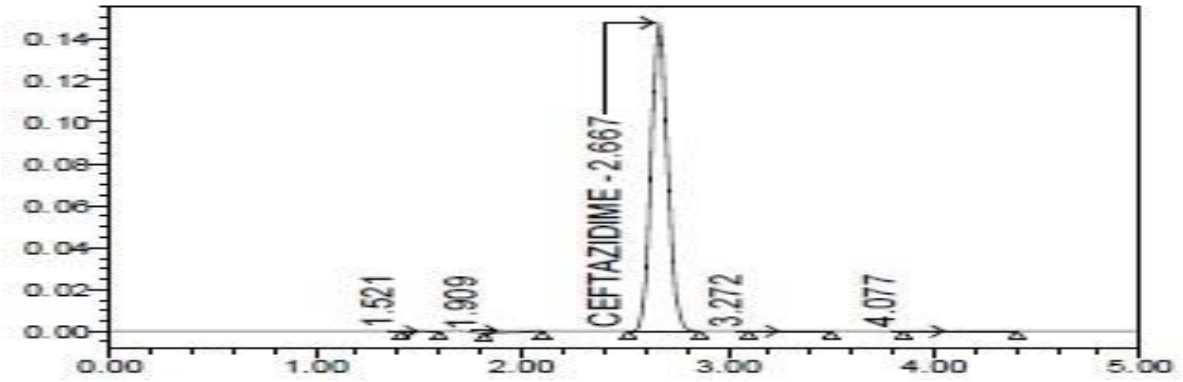


Figure 34: Thermal degraded sample chromatogram

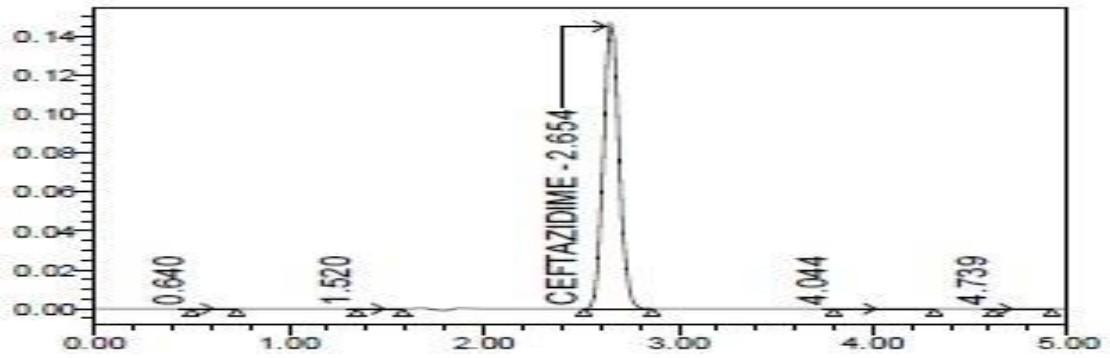


Figure 35: Photo degraded sample chromatogram

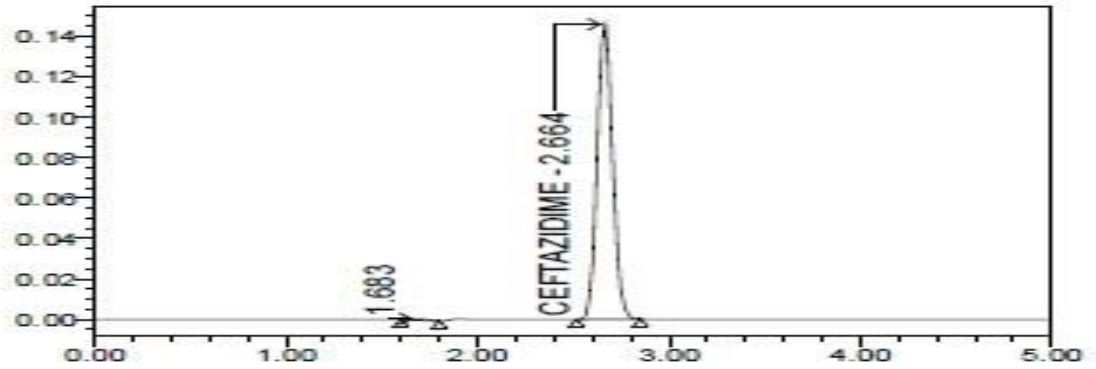


Figure 36 : Water degraded sample chromatogram

CONCLUSION

The developed RP-HPLC method for Ceftazidime was successfully validated. The method showed satisfactory system suitability, specificity, accuracy, precision, linearity (R^2 = 0.9998), robustness and sensitivity (LOD = 0.097 µg/mL; LOQ = 0.322 µg/mL). The degradation study confirmed its stability-indicating nature. Hence, the method is suitable for routine analysis of Ceftazidime in pharmaceutical formulations.

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